

## THE FUTURE OF AEROLOGY

551.5 (048) By W. PEPPLER

[Abstract by H. C. Frankenfield from "Das Wetter," Heft 3, March, 1926]

(1) Aerology during the last 10 years has virtually been at a standstill.

(2) Aerological accomplishments of the last 20 years made possible the development of the Bjerknes theories, and their further progress depends entirely upon aerology.

(3) Especially necessary for the future of aerology is an intensive investigation of the upper half of the troposphere and the lower portion of the stratosphere. Little is known of the alto-cumulus and the cirrus. Knowledge of the strata above 4 k. m. is more important than that of the lower strata.

(4) The first step should be a complete reorganization of observational methods. Earlier observations are only partially comparable.

(5) A more accurate survey of the aerological conditions of the air strata up to about 1,000 meters is also necessary. In the present method of conducting captive-balloon ascents detailed registration is lost for the most part. A knowledge of the turbulence as well as of the structure of the strata near the surface can also be acquired.

(6) Special results are expected from the systematic coordination of radiation measurements with aerology. Radiation apparatus has not yet been successfully devised that will permit aerological technique to be placed in direct service for radiation investigation.

(7) Investigation of the influence of turbidity particles by the customary methods is already possible through the Wigand visibility measure.

(8) Measurements of incoming and outgoing radiation should be made.

(9) The airplane offers a new and very important factor for the future of aerology, as, on account of its mobility, it is superior in many respects to the old methods, especially for the study of optics, atmospheric electricity, turbulence, radiation, clouds, etc. An efficient airplane meteorograph has been devised.

(10) Old and new methods should be combined and considered together.

(11) We are still far removed from the ideal observatory, and only a small portion of the apparent problems can now be attacked. Present observatories are not well located, and they are too much occupied with practical problems. We have aerological observatories *but no research aerological institutes*. Research must form the fundamental basis, and it must not be strangled by the practical work. The idea that scientific progress is developed from practical work is incorrect. The path of meteorology and weather forecasting leads only over free scientific research.

## A LIGHTNING STROKE FAR FROM THE THUNDER-STORM CLOUD

Mr. J. H. Armington sends us from Indianapolis the report printed below, which was sent to him by Prof. Z. A. McCaughan, of Bloomington, Ind. The stroke occurred about 1 p. m. on July 23, 1926, in Monroe County; it killed two children.

I drove to the place referred to and made personal inquiry of people who were within 100 yards of the place. The sun was shining, the nearest cloud seemed to the witnesses  $2\frac{1}{2}$  or 3 miles north (toward Clear Creek and Bloomington). They had heard no thunder previous to this stroke and heard only two or three of distant thunder afterward. Their sky stayed clear for two hours afterwards. At the time of this stroke we were having frequent

strokes of lightning and thunder here at Bloomington and we had 0.23 inch of rain. Three miles southeast of Bloomington there was a small tornado that broke limbs of trees and carried away anything small that was loose. The lightning was severe. Witnesses near where the children were killed say the lightning traveled horizontally from north to south. It passed three buildings, missing them by about 100 feet, and struck this little house just above the top of the corner foundation post.

The striking of lightning, through clear sky, at points somewhat distant from the region immediately beneath the storm cloud, while relatively rare, occurs probably more frequently than is realized.

During a three-year residence in east-central Florida I observed the phenomenon at least three times. The typical local thunderstorm cloud of the Florida summer grows with great rapidity, and is usually an entity quite unconnected with storms of the same kind that may be developing elsewhere within the observer's field of view. Opportunities for watching the lightning strokes from individual clouds are therefore excellent.

It is my recollection that the distance along the ground between a vertical dropped from the edge of the cloud and the striking point of the bolt was of the order of the height of the cloud base above ground. How foreshortening affected this estimate is of course impossible to say. But it is probably true that the distances were never of the order of 2 to 3 miles, as in the extraordinary case described by Professor McCaughan. In one instance (and I think this was true of all these far flung bolts) the spark seemed to leave the cloud from a point at least halfway up from cloud base to summit, and in this one instance which I recall especially vividly it was about three quarters of the way.—B. M. V.

## LITERATURE ON THE NORMAL DENSITIES OF GASES

Scientific Paper of the Bureau of Standards, No. 529, bears the title, "A Review of the Literature Relating to the Normal Densities of Gases," and was prepared by M. S. Blanchard and S. F. Pickering. The authors state in their abstract that—

\* \* \* the attempt is made to choose the most reliable value for each gas. The number of sources of the gas in question, the methods used for its purification, the precautions observed in making the experimental measurements, the number of observations made, the agreement between observations of a set and the concordance between the results of the different observers have all been carefully considered in the selection of the final value. While many of the early determinations of historical interest have been included in general, only those which should be considered in selecting the final value have been critically reviewed.

## THE SUMMER OF 1926 IN THE UNITED STATES

Summer is usually considered to cover the three months from June to August, inclusive. The records for these months of 1926 show about the usual run of variations in weather, with alternately warm and cool and rainy and dry in different sections and during different times in the season. For the summer, as a whole, the temperature was remarkably uniform, and was slightly above normal over much the greater portion of the country. The seasonal average was  $1^{\circ}$  to  $3^{\circ}$  below normal in most sections from the Ohio Valley and Middle Atlantic States northward, and  $1^{\circ}$  below at about half the stations in the Gulf area. In all other sections the temperature averaged from normal to as much as  $6^{\circ}$  above, the greatest plus departures being in the more western States.

Rainfall was deficient in most of the Northeast, the south Atlantic area, in nearly all of the Great Plains and North Central States, and also in most places in the far Southwest. Elsewhere the amounts were above normal.

For the country, as a whole, about 40 per cent of the stations had more than normal rainfall and the others less than normal.—*Reprint from Weather and Crop Bulletin, September 7.*

#### FIFTH SUCCESSIVE FAVORABLE MONSOON PROBABLE IN INDIA

For the fifth successive year reports from India indicate that the monsoon, or rainy season, will be favorable. A cable received on August 23 from Trade Commissioner C. B. Spofford, Calcutta, states that to date rainfall was slightly above normal on the northwest frontier, and in Rajputana, central India, the Central Provinces, Hyderabad, and Madras; and normal throughout all other regions. It is still blowing actively and the Indian Government forecast for August and September indicates normal rainfall in northwest India and normal or excess on the peninsula.—*Reprint from Commerce Reports, September 6, 1926, No. 36.*

#### METEOROLOGICAL SUMMARY FOR SOUTHERN SOUTH AMERICA, JULY, 1926

By SEÑOR J. B. NAVARRETE, DIRECTOR

[El Salto Observatory, Santiago, Chile]

The first half of July was much the more rainy, in contrast to the second half, which was relatively dry.

The month opened with an important anticyclonic center off the central zone, with a maximum pressure of 768 mm. at the Island of Juan Fernandez.

Between the 3d and the 6th a large depression crossed the far southern region and showed its influence throughout the country in general bad weather, heavy winds and rains. The maximum precipitation in a day was observed on the 6th at San Fernando, 81 mm. Increases in river stages and floods were general.

From the 7th to the 9th the bad weather abated temporarily, while the pressure rose and continued variable, with low temperatures.

Between the 10th and 13th another great depression affected the country, causing general bad weather, violent winds, and rains as far as Coquimbo, where on the 11th there was observed a 24-hour rainfall of 44 mm. Heavy as this was, the maximum rainfall occurred on the 13th at San Fernando, 79 mm. in 24 hours. Again there was a general rise of rivers and occurrence of floods.

On the 14th and 15th the bad weather moderated, upon the establishment of anticyclonic control over the country. On the 16th and 17th there were scattered and light rains as far north as Valdivia.

Between the 19th and 21st a fairly important depression influenced the country; the change of weather began with heavy mists in the central zone, and ended on the 21st with a rain from Valparaíso to Valdivia. Maximum

precipitation was registered at Arauco, 23 mm. in 24 hours. The weather then continued variable; fine weather occurred again on the 22d; on the 23d a new depression crossed the southern zone, and on the early morning of the 24th there were violent squalls of rain and snow in the central zone as far north as Santiago. On the 25th general fine weather was reestablished, anticyclonic control dominating the whole country.

Between the 26th and 28th a depression crossed the far south, causing dense mists and light rains in the southern zone, which extended into the central zone as far as Santiago.

On the 29th and 30th the weather was again fine, but on the 31st a large depression began to influence the southern part of the country, breaking with a violent storm of wind and rain between Arauco and Chiloe.

To summarize, the month of July showed a much more boisterous first half, a second half of more stable character; but in the last days of the month a new period of foul weather was threatening in the south.—*Transl. B. M. V.*

#### METEOROLOGICAL SUMMARY FOR BRAZIL, JULY, 1926

By FRANCISCO SOUZA, Acting Director

[Directoria de Meteorologia, Rio de Janeiro]

During July the circulation in the lower strata of the atmosphere was rather active; six anticyclones entered the southern part of the continent, most of them very extensive; the continental depression and those of high latitudes showed unusual activity during the period. Practically all the paths of the anticyclones were normal. Frosts continued to be observed in the southern part of the country.

Rainfall was in general scant, except in parts of the central and southern region, where the values averaged above normal.

The blooming and growth of cane and tobacco were hindered by frosts and lack of rain. In the State of Bahia and in the northern part of the country atmospheric conditions were favorable to cacao and cotton. Wheat made good growth. The harvests of cotton and coffee in the central and southern part of the country are not giving good yields, and those of cane in the northern part are not promising.

Weather conditions in Rio de Janeiro were in general good, with much cloudiness. In temperature the days were relatively warm, and they were dry; but the nights were fresh and sometimes cold. Rainfall during the month was pitifully small. During a period of 75 years, or since 1851, there have been seven years in which the month of July showed rainfall similar to or at times lower than this.—*Transl. W. W. R. and B. M. V.*

#### BIBLIOGRAPHY

C. FITZHUGH TALMAN, in Charge of Library

##### RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

Alter, J. Cecil.

Mountain snow condition and rate of melting. p. 6-7. 37½ cm. (Utah farmer, 45th yr., June 25, 1926.)

Bénévent, Ernest.

Le climat des Alpes françaises. Paris. 1926. 435 p. figs. plates. 33 cm. (Mém. de l'Off. nat. mét. de France.)

Betz, Albert.

Wind-Energie und ihre Ausnutzung durch Windmühlen. Göttingen. 1926. v, 64 p. figs. plates. 23 cm.

Celebrazione del II.º centenario dall'inizio delle osservazioni meteorologiche in Padova. MDCCXXV-MCMXXV. Pinova. 1926. 104 p. plates (part fold.). 24½ cm. (Atte e mem. della R. Accad. di sci., lett. ed arti in Padova. Anno 385, 1925-26. N. S., vol. 42, disp. I.)

Delcambre.

Lexique météorologique. Paris 1926. fasc. 1, abaque-bolomètre. illus. plates. 32 cm.

Estalella, José.

Algunas consideraciones sobre la formación del granizo. p. 251-258. illus. 21½ cm. (Anales de la Soc. Española de física y química. t. 24, 1926.)